A Compendium of Electrogravitational Work for the Years 2009-2010

by

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Several decades ago it occurred to me that all matter at the fundamental quantum level was refreshed from one basic moment to the next by energy pulses from what I call energy space, the same energy space that created the original Big Bang event.

The reason for this viewpoint was arrived at by considering the case of two photons in parallel travel and able to observe each other. Photon A observes photon B as standing still and photon B observes Photon A as standing still since both are traveling at the same speed. Not having read about Maxwell's equations that proved they must be traveling at the velocity of light, they both conclude that they are not moving at all since they are the only matter in an otherwise empty universe. Photons A and B may also conclude that they have 'rest' mass since they do not seem to be moving and yet they do have energy related to their frequency. In fact, since there is no other matter, the concept of 'universe' has little or no physical meaning.

This led me to conclude that particles *with* rest mass may also regard the rest of the physical universe as nonexistent in a non-local sense since their Compton parameters of wavelength and time depend on the speed of light also. That is, all particles with rest mass see all other particles with rest mass as nonmoving in the non-local sense even though a local space observer may see relative motion between particles with rest mass. This requires more than one universe. The non-local primordial universe would be devoid of distance and time and be composed of pure energy that could be metered out to the local space particles via their centers of Compton wavelength which serves as an interface for non-local space to local space. Without the input from energy space, no change in momentum in local space quanta could ever occur.

Energy space can be regarded as parallel input to all matter in local space while the refresh input can be considered as clocking the progression of all motion in serial fashion for local space. This also explains the so-called "arrow of time" concept as applied to local space. Non-local energy space may be viewed as being instantly connected from one non-local point having nearly infinite energy to all points located at the center of local space quanta, no matter how far separated from each other in local space. Then the clocking rate pulse width can be considered to be what is called Plank time. The basic clocking rate would be the Compton time for the quantum particle and the energy input would be the energy required to support the field and the change in motion. For instance, the energy space potential energy input times Plank time times the Compton frequency would give the rest mass energy of the electron. More energy input during acceleration would require a temporary increase of the refresh frequency. For relativistic local space mass-energy increase, the Plank time refresh pulse width would increase accordingly.

Energy space potential input to an electron can be calculated as:

$f_e := 1.235589780 \cdot 10^{20} \cdot Hz$ Compton electron frequency.

$t_P := 1.351212496 \cdot 10^{-43} \cdot sec$ Plank time.

$E_e := 8.187111168 \cdot 10^{-14} \cdot joule$ Electron rest mass energy.

Thus, the potential input energy to the electron from energy space is:

$$E_{Pe} := \frac{E_e}{f_e \cdot t_P} \qquad E_{Pe} = 4.90379974915587 \times 10^{9}\ joule$$

This is the potential energy space energy input available for one electron. Then the reservoir energy that supports the entire universe must be scaled up considerably as a result.

Contemporary physics regards the photon as the force carrier for the force fields that act between quantum particles. In contrast, steady-state force fields invoke the virtual photon. However, virtual photons by accepted definition cannot exert real effects and therefore the mechanics of the virtual photon as being a static field force carrier must be invalid. Further, the steady-state electric and magnetic force fields must have photons that have energy in the field that can be measured. No such energy can be measured and thus photons which are generated by time dependent changes in state of a charge cannot be applied to steady state electric and magnetic force fields.

As for *space-time* bending for the gravitational force field explanation, the same logic must apply. If the speed of gravity is linked to the speed of light, how is it that the event horizon of a black hole allows for gravitational force to pass beyond the veil unimpeded? The answer may be that gravitational force is a non time-dependent field just as for the steady state electric and magnetic fields. Bending of space-time is foo-foo since it invokes the assumption that a real effect can be derived from that which has no tangible existence. As a result, pseudo-intellectual smoke and mirrors is the present state of contemporary gravitational field theory.

In a special issue by Discover Magazine[4] titled, "Einstein", the question of whether time exists at the quantum level is quoted below.

Quote: **"One finds that time just disappears from the Wheeler-DeWitt equation," says Carlo Rovelli, a physicist at the University of the Mediterranean in Marseilles, France. "It is an issue that many theorists have puzzled about. It may be that the best way to think about quantum reality is to give up the notion of time-that the fundamental description of the universe must be timeless."** --Unquote.

The universe is fundamentally quantum. As a result, at the most fundamental level, it is also timeless. Hence, the steady state force fields, the electric, magnetic and gravitational force fields at the quantum level can also be considered as timeless. Present day theoretical physics demands that <u>all</u> force fields must be based on photon exchange which does not work even from the most simplistic forms of mechanics based on well understood principles of action and reaction. All of this confusion is likely based on Maxwell's study of electromagnetics which is firmly rooted in fields that change in amplitude over time. This led to his famous discovery that electromagnetic waves travel in free space at the speed of light. As a result, Albert Einstein based his special and General Theories of Relativity on that notion. Unfortunately for the actual mechanics of gravitation, this notion carried over to having a gravitational theory that is also limited to photon exchange. Hence the mess that we are now in concerning the actual mechanics of gravitation.

As a result, my Theory of Electrogravitation was brought forth in the early 1990's to resolve this problem. The paper herein examines the steady state force fields of the **electrogravitational. magnetic, weak, electric, and strong force fields** as fields that exert force but do not change with time on the fundamental quantum level. It is this approach which allows for the unification of all of the force fields. The contemporary approach that recognizes only the gravitational, electromagnetic, weak and strong force fields will not allow for unification due to the fields being connected to time varying parameters. Also, the most important field, that of the magnetic force field, is hidden in the so-called electromagnetic force field.

If the steady state magnetic or electric fields can exert force as evidenced by pairs of magnets or electric charges, what is the frequency of the so-called photon coupling? What is the photon energy level? <u>No bolometer can measure electromagnetic power in the steady state force field, no matter how sophisticated.</u> (Again, virtual photons cannot be considered since they cannot exert real force by definition of the term virtual.) As a result, I propose that the force exists through what I have termed as energy space which is non-local space that is timeless as well as dimensionless. The following work demonstrates that concept for all five forces as outlined above.

The incomplete foundations of contemporary field theory will most likely fail to stand on the shaky ground it is built upon. In contrast, Electrogravitation is built upon the foundation of the universe, the primordial source of energy that originally created and continues to sustain the universe.

Equalprn1.MCD The below parameters are stated for the purpose of calculations to follow:

$\mu_o := 4\cdot\pi\cdot 10^{-07}\cdot \text{henry}\cdot \text{m}^{-1}$	Magnetic permeability of free space.
$\varepsilon_o := 8.854187817\cdot 10^{-12}\cdot \text{farad}\cdot \text{m}^{-1}$	Electric permittivity of free space.
$f_{LM} := 1.003224805\cdot 10^{01}\cdot \text{Hz}$	Electrogravitational frequency.
$t_{LM} := f_{LM}^{-1}$	Electrogravitational time.
$q_o := 1.602177330\cdot 10^{-19}\cdot \text{coul}$	Least quantum electronic charge.
$i_{LM} := q_o\cdot f_{LM}$	Electrogravitational current.
$l_q := 2.817940920\cdot 10^{-15}\cdot \text{m}$	Classic electron radius.
$R_{n1} := 5.291772490\cdot 10^{-11}\cdot \text{m}$ $\quad \Delta r_x := R_{n1}$	Hydrogen n1 radius.
$\lambda_{LM} := 8.514995416\cdot 10^{-03}\cdot \text{m}$	Electrogravitational wavelength.
$\alpha := 7.297353080\cdot 10^{-03}$	Fine structure constant.
$\lambda_{prt} := 1.321409993\cdot 10^{-15}\cdot \text{m}$	Proton Compton wavelength.
$R_s := \sqrt{\frac{\mu_o}{\varepsilon_o}}$ $\quad R_s = 376.730313474969\ \text{ohm}$	Open (free) space impedance.
$R_Q := R_s\cdot\frac{1}{2\cdot\alpha}$ $\quad R_Q = 2.58128056395874 \times 10^{4}\ \text{ohm}$	Quantum inner space impedance.
$c := 2.99792458\cdot 10^{08}\cdot\frac{\text{m}}{\text{sec}}$	Speed of light in open space.
$v_{LM} := f_{LM}\cdot\lambda_{LM}$	Electrogravitational velocity.
$h := 6.626075500\cdot 10^{-34}\cdot \text{joule}\cdot \text{sec}$	Plank's constant.
$f_{H1} := 1.420405751786\cdot 10^{09}\cdot \text{Hz}$	Hydrogen fine structure frequency.
$m_e := 9.109389700\cdot 10^{-31}\cdot \text{kg}$	Electron rest mass.
$G := 6.672590000\cdot 10^{-11}\cdot \text{newton}\cdot \text{m}^{2}\cdot \text{kg}^{-2}$	Gravitational constant.

The below page titled "MassUnits.MCD" shows that mass is generated in local space from a three dimensional time axis approach wherein one of the time dimensions is changing. This is separate from the non-changing electric and magnetic force fields associated with the mass of the particle. This suggests that local space mass and the associated field is derived from the non-local input from energy space. A change in momentum of a particle having electrical charge causes a shedding of the field that becomes electromagnetic radiation and the energy lost to that radiated field is made up by energy input from non-local energy space. This may be the source of dark energy and at the same time the force of attraction through energy space that causes electrogravitation.

Electron mass can be stated as: $\text{mass} = \dfrac{\mu_o \cdot q_o^2}{4 \cdot \pi \cdot l_q}$ where μ_o is the permeability of free space, 1)

q_o is the fundamental electric charge, and l_q is the classic electron radius.

The permeability of free space is stated as henry per meter. Then it follows that using unit analysis, the following will derive mass in terms of charge, volts, distance and time.

$$L := \frac{\text{volt} \cdot \text{sec}^2}{\text{coul}} \qquad L = 1\ \text{henry} \qquad \text{mass} := \left(\frac{\text{volt} \cdot \text{sec}^2}{\text{coul} \cdot \text{m}}\right) \cdot \frac{\text{coul}^2}{\text{m}} \quad \text{thus,} \quad \text{mass} = 1\ \text{kg} \qquad 2)$$

Contained in the mass statement above is the vector magnetic potential (**A** vector) which is in the units of volts times seconds all divided by the meter. The **A** vector is a non-local field which exists in space apart from the magnetic **B** field that it is associated with and may be totally shielded and physically isolated from it. Also contained in the above equation is the magnetic **B** field in volts times seconds all divided by meters squared. The above equation is reduced by factoring to:

{A} {B} 3)

$$\frac{\text{volt} \cdot \text{sec}^2}{\text{coul} \cdot \text{m}} \cdot \frac{\text{coul}^2}{\text{m}} \quad \text{simplifies to} \quad \frac{\text{volt} \cdot (\text{sec})^2 \cdot \text{coul}}{\text{m}^2} = 1\ \text{kg} \qquad \text{Note:} \quad A_{vec} := 1 \cdot \frac{\text{volt} \cdot \text{sec}}{\text{m}}$$

If the three dimensional local space is considered as time vectors rather than distance, and further that the existence of a local space particle is a series of non-local inputs for refreshing local mass-energy, then the change of momentum of a particle in local space is determined by a change in the refresh rate. This is a quantum aspect, much like planks constant, wherein the energy times time equals a constant, h. Increased kinetic energy results in a decreased time which amounts to an increase in the refresh rate, or frequency of refresh. This amounts to a constant mass energy per length which also amounts to a constant force. This neglects the relativistic case where the Plank time width increases. In electrogravitation, a force constant is a necessary part of the interaction mechanics between two local particles via non-local energy space. Mass and momentum are derived from energy space to local space as shown below.

Mass: {A} Momentum: {B}

$$\int_{1 \cdot \text{sec}}^{\sqrt{3} \cdot \text{sec}} \frac{\text{volt} \cdot \text{sec} \cdot \text{coul}}{\text{m}^2}\, d\text{sec} = 1\ \text{kg} \qquad \frac{d^1}{d\text{sec}^1} \int_{1 \cdot \text{m}}^{2 \cdot \text{m}} \int_{1 \cdot \text{sec}}^{\sqrt{3} \cdot \text{sec}} \frac{\text{volt} \cdot \text{sec} \cdot \text{coul}}{\text{m}^2}\, d\text{sec}\, d\text{m} = 1\ \text{kg}\,\text{m}\,\text{s}^{-1} \qquad 4)$$

Then force by:

$$\frac{d^2}{d\text{sec}^2} \int_{1 \cdot \text{m}}^{2 \cdot \text{m}} \int_{1 \cdot \text{sec}}^{\sqrt{3} \cdot \text{sec}} \frac{\text{volt} \cdot \text{sec} \cdot \text{coul}}{\text{m}^2}\, d\text{sec}\, d\text{m} = 1.00000000000002\ \text{kg}\,\text{m}\,\text{s}^{-2} \qquad 5)$$

Then finally, energy:

$$\frac{d^2}{d\text{sec}^2} \int_{1 \cdot \text{m}}^{e \cdot \text{m}} \int_{1 \cdot \text{m}}^{2 \cdot \text{m}} \int_{1 \cdot \text{sec}}^{\sqrt{3} \cdot \text{sec}} \frac{\text{volt} \cdot \text{sec} \cdot \text{coul}}{\text{m}^2}\, d\text{sec}\, d\text{m}\, d\text{m} = 1.00000000000002\ \text{kg}\,\text{m}^2\,\text{s}^{-2} \qquad 6)$$

The genesis and support of of mass from energy space to local space is shown by equation 4A above. I have postulated that energy space is timeless and has infinite energy amplitude. This is much like the modified Dirac delta function which for this discussion has infinite amplitude at zero time and is zero at any time otherwise. In observable and thus local space, there is not allowed in nature such a thing as infinitely small or large anything. Rather, there is a least quantum limit in the direction of small and as a result, a limited amount of what can be considered the allowable extent of what is large. This can be termed the weighted impulse function which in transient analysis is a rational form of the delta function. The lower limit of time in local space that is connected to energy space is therefore what is called Plank time t_p , and as a result, the energy potential by the Heisenberg expression E x t_p = h makes E (energy) very large.

To allow for zero time, a form of energy must exist that is independent of time and that is what is called a static field. Then pure energy space with zero time must be a perfect static field, timeless and infinite in energy. As a result, no time implies no distance or space-time metric at all. **Equation 4A above shows time as being necessary to generate mass.** Now the question is, what causes time? Might the arrow of time arise from energy refresh intervals that support the existence of quantum mass created by one fluctuation event? It follows logically that there exists the observed arrow of time by reason that a reverse time would cause deconstruction of the universe.

The answer to the question, "what causes time?' is obvious. The weighted impulse function is the delta function δ modified to energy amplitudes less than infinite and when a time (t) greater than zero is involved. As mentioned above, the Dirac delta function is infinite in energy potential at zero time and zero energy at all other time scales. The weighted impulse function $\delta(t)$ approach transforms or steps down the energy from energy space to energy that is connected to an impulse time which acts as an energy gate.

Plank time t_p evolves from the energy to local space interface as shown below where the gravitational constant G is multiplied by Plank's constant h and then divided by the fifth power of the speed of light and the square root is taken of the result. Then the related wavelength λ_p is arrived at in similar fashion except that the speed of light c is raised only to the third power.

$$t_p := \sqrt{\frac{G \cdot h}{c^5}} \qquad t_p = 1.35121249577289 \times 10^{-43}\,\text{sec}$$ Plank time. 7)

$$\lambda_p := \sqrt{\frac{G \cdot h}{c^3}} \qquad \lambda_p = 4.05083315388068 \times 10^{-35}\,\text{m}$$ Plank wavelength. 8)

$$V_e := m_e \cdot c^2 \cdot q_o^{-1} \qquad V_e = 5.10999064504728 \times 10^5\,\text{volt}$$ Electron rest mass energy in volts. 9)

Substituting the Plank time and wavelength values into equation 4A above, we arrive at the exact mass of the electron. This validates equation 4A when actual constants of nature are involved.

$$\left[\int_{1 \cdot t_p}^{\sqrt{3} \cdot t_p} \frac{V_e \cdot t_p \cdot q_o}{(\lambda_p)^2}\, dt_p\right] = 9.1093897 \times 10^{-31}\,\text{kg}$$ where the electron mass is equal to, $$m_e = 9.1093897 \times 10^{-31}\,\text{kg}$$ 10)

The square root of three implies a 120 degree phase angle which occurs frequently in molecular bonds. It also implies the phase angle of mass creation from energy space. Anytime an electromagnetic wave parameters fit the above equation, mass would be created from energy space into local space.

Mass by:

$v_{LM} = 0.085424546157925\ m\,s^{-1}$

$$V_{LM} := \frac{m_e \cdot (v_{LM})^2}{q_o} \qquad V_{LM} = 4.14900596811528 \times 10^{-14}\,\text{volt} \qquad 11)$$

$\Phi_o := 2.067834610 \cdot 10^{-15} \cdot \text{volt} \cdot \text{sec}$ = magnetic quantum fluxoid in S.I. units

$$V_{\Phi LM} := 2 \cdot (\Phi_o \cdot f_{LM}) \qquad V_{\Phi LM} = 4.149005946779 \times 10^{-14}\,\text{volt} \qquad 12)$$

$$\left[\int_{1 \cdot t_{LM}}^{\sqrt{3} \cdot t_{LM}} \frac{V_{\Phi LM} \cdot t_{LM} \cdot q_o}{(\lambda_{LM})^2}\, dt_{LM}\right] = 9.10938965315492 \times 10^{-31}\,\text{kg} \qquad 13)$$

Then an <u>electrogravitational force potential</u> by:

$$\frac{d^2}{dt_{LM}^{\,2}}\left(\int_{1 \cdot \lambda_{LM}}^{2 \cdot \lambda_{LM}} \int_{1 \cdot t_{LM}}^{\sqrt{3} \cdot t_{LM}} \frac{V_{\Phi LM} \cdot t_{LM} \cdot q_o}{\lambda_{LM}^{\,2}}\, dt_{LM}\, d\lambda_{LM}\right) = 7.80674908817195 \times 10^{-31}\,\text{newton} \qquad 14)$$

Electrogravitational energy equals force times distance:

$$\left(\frac{d^2}{dt_{LM}^{\,2}} \int_{1 \cdot \lambda_{LM}}^{2 \cdot \lambda_{LM}} \int_{1 \cdot t_{LM}}^{\sqrt{3} \cdot t_{LM}} \frac{V_{\Phi LM} \cdot t_{LM} \cdot q_o}{\lambda_{LM}^{\,2}}\, dt_{LM}\, d\lambda_{LM}\right) \cdot \lambda_{LM} = 6.64744326996463 \times 10^{-33}\,\text{joule} \qquad 15)$$

Energy also by the below expression: **<u>(Note the natural number e in the second wavelength integral)</u>**

$$\frac{d^2}{dt_{LM}^{\,2}} \int_{\lambda_{LM}}^{e \cdot \lambda_{LM}} \int_{1 \cdot \lambda_{LM}}^{2 \cdot \lambda_{LM}} \int_{1 \cdot t_{LM}}^{\sqrt{3} \cdot t_{LM}} \frac{V_{\Phi LM} \cdot t_{LM} \cdot q_o}{\lambda_{LM}^{\,2}}\, dt_{LM}\, d\lambda_{LM}\, d\lambda_{LM} = 6.64744326996457 \times 10^{-33}\,\text{joule} \qquad 16)$$

Where: $E_{LM} := h \cdot f_{LM}$ $\qquad E_{LM} = 6.64744330140278 \times 10^{-33}\,\text{joule}$ 17)

which is a much simpler statement but one which lacks the total energy induction from energy space mechanics.

Then the magnetic force potential related to the energy space/local space action/reaction is:

$$\frac{d^2}{dt_{LM}^2}\int_{\lambda_{LM}}^{e\cdot\lambda_{LM}}\int_{1\cdot\lambda_{LM}}^{2\cdot\lambda_{LM}}\int_{1\cdot t_{LM}}^{\sqrt{3}\cdot t_{LM}}\frac{V_{\Phi LM}\cdot t_{LM}\cdot q_o}{\lambda_{LM}^2\cdot R_{n1}}\,dt_{LM}\,d\lambda_{LM}\,d\lambda_{LM} = 1.25618463048561\times 10^{-22}\,\text{newton} \qquad 18)$$

where also, the magnetic force potential may be stated as:

$$\frac{d^2}{dt_{LM}^2}\left(\int_{1\cdot\lambda_{LM}}^{2\cdot\lambda_{LM}}\int_{1\cdot t_{LM}}^{\sqrt{3}\cdot t_{LM}}\frac{V_{\Phi LM}\cdot t_{LM}\cdot q_o}{\lambda_{LM}^2}\,dt_{LM}\,d\lambda_{LM}\right)\cdot\frac{\lambda_{LM}}{R_{n1}} = 1.25618463048562\times 10^{-22}\,\text{newton} \qquad 19)$$

and the simple form is: $h\cdot\frac{f_{LM}}{R_{n1}} = 1.25618463642657\times 10^{-22}\,\text{newton}$ 20)

Finally, the two-system local space => Non-local space => local space interaction for R_{n1} is given by:

$$F_{EG} := \left[\frac{d^2}{dt_{LM}^2}\left(\int_{1\cdot\lambda_{LM}}^{2\cdot\lambda_{LM}}\int_{1\cdot t_{LM}}^{\sqrt{3}\cdot t_{LM}}\frac{V_{\Phi LM}\cdot t_{LM}\cdot q_o}{\lambda_{LM}^2}\,dt_{LM}\,d\lambda_{LM}\right)\cdot\frac{\lambda_{LM}}{R_{n1}}\right]^2\cdot\mu_o \qquad 21)$$

$F_{EG} = 1.98297306412551\times 10^{-50}\,\text{newton}\cdot\frac{\text{henry}}{\text{m}}\cdot\text{newton}$ $\qquad \frac{G\cdot m_e^2}{R_{n1}^2} = 1.97729138896852\times 10^{-50}\,\text{kg m s}^{-2}$

One Newton parameter and the magnetic permeability of free space are not variable and thus are hidden.

Note that c times alpha is the energy equivalent n1 velocity in the H1 atom:

Or: $v_{n1} := c\cdot\alpha$ $\qquad v_{n1} = 2.18769141674707\times 10^{6}\,\text{m s}^{-1}$ 22)

then: $\frac{\lambda_{LM}}{\alpha} = 1.16686082236273\,\text{m}$ and finally, $\frac{v_{n1}}{\lambda_{LM}} = 2.5692220722002\times 10^{8}\,\text{Hz}$ 23)

This frequency is fundamental to the magnetic force potential and as a result, it is also fundamentally important to the electrogravitational force as well. It ties the quantum electrogravitational wavelength to the energy equivalent velocity in the n1 shell of the hydrogen atom. **Impinging the above frequency on pure hydrogen gas may reveal unexpected energy release from energy space as well as interfering with gravitational and magnetic forces in general.**

The five forces summarized from the ebook, "Electrogravitation As A Unified Field Theory", by Jerry E. Bayles.

Electrogravitational force

(A) variable volt*sec/meter	|---------constant newton---------| (amp)	(amp)	(A) variable volt*sec/meter

$$F_{EG} := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \qquad 24)$$

Note: (A) = volt * sec / m = weber/m $\qquad F_{EG} = 1.9829730807819 \times 10^{-50} \text{newton} \cdot \frac{\text{henry}}{\text{m}} \cdot \text{newton}$

The force expressions are for two electron charges at the n1 energy level of the Bohr Hydrogen atom. The force is corrected to the hydrogen *atom* with the proton-electron combination by adjusting the permeability constant upwards by the ratio of the proton mass over the electron mass.

The 'amp' expression times the quantum ohm yields volts and charge times volts equals energy. Thereafter, energy divided by Plank's constant h yields frequency.

$$\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot R_Q = 0.125370855764925 \text{ volt} \qquad \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot R_Q \cdot (q_o) = 2.00866342949263 \times 10^{-20} \text{joule} \qquad 25)$$

$$f_{IQK} := \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot R_Q \cdot (q_o) \cdot h^{-1} \qquad f_{IQK} = 3.03145267435094 \times 10^{13} \text{Hz} \qquad 26)$$

The force constant yields:

$$F_{FQK} := \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \quad \text{where,} \quad F_{FQK} = 2.96437145031182 \times 10^{-17} \text{newton} \qquad 27)$$

Multiplying this by the electrogravitational wavelength constant and dividing by h:

$$f_{FQK} := \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \lambda_{LM} \cdot h^{-1} \qquad f_{FQK} = 3.80943581320895 \times 10^{14} \text{Hz} \qquad 28)$$

The ratio of f_{FQK} to f_{IQK} is:

$$\frac{f_{FQK}}{f_{IQK}} = 12.5663707219991 \quad \text{where} \quad 4 \cdot \pi = 12.5663706143592 \qquad 29)$$

The lower frequency f_{IQK} is a local space interface quantum frequency constant while the upper frequency f_{FQK} is the non-local space interface quantum frequency constant and both are connected by the geometry of 4 times π. These can be considered as standing wave frequencies and normally do not radiate but possibly can be interfered with through external electromagnetic radiation. **Since these frequency couplings occur for all five forces, they are fundamentally of extreme importance to all five fields and therefore the structure of all matter.**

The electrogravitational force equation contains two magnetic force elements connected to a common parameter known as the free space permeability constant, μo. The magnetic force is comprised of the quantum current element and the **A** vector term as shown below.

Magnetic force

(A) (amp)

$$F_{EM} := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \qquad F_{EM} = 1.25618463576141 \times 10^{-22} \text{ newton}$$ 30)

Note that:

$$\left[\left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \frac{\lambda_{LM}}{h} = 1.61428984851712 \times 10^{9} \text{ Hz}$$ 31)

Where:

$$\frac{F_{EM} \cdot \lambda_{LM}}{\left[\left[\left(\frac{4}{\pi} - 1\right) \cdot \frac{1}{2}\right] + 1\right] \cdot h} = 1.42025494168076 \times 10^{9} \text{ Hz}$$ 32)

Which is the hyperfine radiation frequency of the hydrogen atom.

The 4/pi term is equal to the slope of the Great Pyramid at Giza as well as being very close to the square root of the Golden Ratio

Also:

$$f_{H1} - \frac{F_{EM} \cdot \lambda_{LM}}{\left[\left[\left(\frac{4}{\pi} - 1\right) \cdot \frac{1}{2}\right] + 1\right] \cdot h} = 1.50810105237007 \times 10^{5} \text{ Hz}$$ 33)

Weak force

(------------------------------------- F_{EE} -------------------------------------)

(Volt*m/sec) (------------- Watt Constant -------------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{EW} := \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \left[(3) \cdot \sqrt{\frac{\mu_o}{\varepsilon_o}}\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right)\right] \cdot \left[\frac{(\pi)^2}{\varepsilon_o}\right] \cdot \left(\frac{\mu_o \cdot i_{LM}^2 \cdot \lambda_{LM}^2}{4 \cdot \pi \cdot \Delta r_x^2}\right)$$ 34)

$$F_{EW} = 1.0741793518998 \times 10^{-21} \text{ m}^6 \text{s}^{-6} \text{A}^{-4} \text{newton}^4 \cdot \text{watt}$$

Where, the nuclear magnetic force at R_{n1} is:

$$F_{NM} := \left(\frac{\mu_o \cdot i_{LM}^2 \cdot \lambda_{LM}^2}{4 \cdot \pi \cdot \Delta r_x^2}\right)$$ 35)

Or:

$$F_{NM} = 6.68935426622501 \times 10^{-27} \text{ newton} \quad \text{and} \quad \alpha^2 \cdot F_{EM} = 6.6893542745341 \times 10^{-27} \text{ newton}$$ 37)

$$Pwr_{Rn1} := \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \qquad Pwr_{Rn1} = 1.12900244691929 \times 10^{-5} \text{ m s}^{-1} \text{ watt}$$ 38)

Electrostatic force

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec)

$$F_{EE} := \left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right) \quad 39)$$

$$F_{EE} = 8.31727307693918\times10^{-8}\,m^4 s^{-4} A^{-2}\,newton^2\cdot watt$$

where, $\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x} = 2.32452116172757\,\frac{volt\cdot m}{sec}$ The Electrostatic force watt constant is: 40)

$$S_{cE} := \left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]$$ and $$S_{cE} = 1.53926697703375\times10^{-8}\,watt \quad 41)$$

Strong force

(------------------------------------ F_{EE} -------------------------------------)

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{ES} := \left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\right]\cdot\left(\frac{2\cdot\pi\cdot R_{n1}}{\varepsilon_o\cdot\Delta r_x}\right)\cdot\left(\frac{\mu_o\cdot i_{LM}^2\cdot\lambda_{LM}^2}{4\cdot\pi\cdot\Delta r_x^2}\right) \quad 42)$$

$$F_{ES} = 3.94817410378542\times10^{-22}\,m^6 s^{-6} A^{-4}\,newton^4\cdot watt$$

At the n1 radius, the ratio of the weak nuclear force to the strong force times the natural number e is very close to unity. $\frac{F_{EW}}{F_{ES}\cdot e} = 1.0008892447674$ 43)

Further, the ratio of the strong force to the magnetic force times pi at the same radius is also very close to unity. $\frac{F_{ES}}{F_{EM}\cdot\pi} = 1.00044437245324\,kg^4 m^{11} s^{-15} A^{-4}$ 44)

Finally, the ratio of the weak nuclear force to the magnetic force times pi and the natural number e is also very close to unity. $\frac{F_{EW}}{F_{EM}\cdot\pi\cdot e} = 1.00133401237652\,kg^4 m^{11} s^{-15} A^{-4}$ 45)

The above three ratios tie in directly to my previous work on my website.[1] The work titled, "Particle Field Energy Down-Scaling Via A new Complex Fine Structure Constant," page 32, equation 119. Therein, the natural number e also is found to arise related to the hyperfine radiation pressure radius to the n1 radius at he n1 level of the H1 atom.[2] **Thus, the hyperfine proton radiation pressure wave may arise from the presence of the nuclear forces at he n1 radius as shown above.**

From Chapter 5 , Equation 192 of My book, "**Electrogravitation As A Unified Field Theory**",[3] the Electrogravitational power constant is derived as:

Let: $\phi := \left(\frac{4}{\pi}\right)^2$ rad **(The phase is between the non-local Plank time energy input pulse and the Compton local refresh time of the particle.)**

$$S_{cK} := \left(\frac{q_o \cdot v_{LM} \cdot \sin(\phi)}{l_q}\right) \cdot R_s \cdot \left(\frac{q_o \cdot v_{LM} \cdot \sin(\phi)}{l_q}\right) \qquad S_{cK} = 8.86445813044208 \times 10^{-9}\,\text{watt} \qquad 46)$$

$$Fgrav := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \frac{S_{cK}}{c} \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right)$$

Where:

$$\phi = 1.6211389382774\,\text{rad} \qquad 47)$$

or, $\phi = 92.8844191676145\,\text{deg}$

$$Fgrav = 1.97795172060819 \times 10^{-50}\,\text{newton} \cdot \frac{\text{henry}}{\text{m}} \cdot \text{newton} \qquad 48)$$

The above force is very close to exact agreement with Newton's gravitational formula answer for two electron masses separated by $R_{n1} = \Delta r_x$.

Adjustment of R_s to R_Q also requires the adjustment of l_q.

$$R_Q = 2.58128056395874 \times 10^4\,\text{ohm} \text{ where, } \quad l_{q'} := l_q \cdot \sqrt{\frac{1}{2 \cdot \alpha}} \quad \text{or,} \quad l_{q'} = 2.33256742235395 \times 10^{-14}\,\text{m} \qquad 49)$$

$$S_{cKQ} := \left(\frac{q_o \cdot v_{LM} \cdot \sin(\phi)}{l_{q'}}\right) \cdot R_Q \cdot \left(\frac{q_o \cdot v_{LM} \cdot \sin(\phi)}{l_{q'}}\right) \qquad S_{cKQ} = 8.86445813044208 \times 10^{-9}\,\text{watt} \qquad 50)$$

The result is the same as for S_{cK} above but in quantum ohm terms which is the door to non-local energy space. Non-local energy space keeps the watt constant a constant as it supplies energy to local space magnetic and electric fields.

It is of no small interest that the square root of 1 over two times alpha can also be applied to <u>reduce</u> l_q:

Proton radius: $r_p := \frac{\lambda_{prt}}{2 \cdot \pi}$ and $l_{q''} := \frac{l_q}{\sqrt{\frac{1}{2 \cdot \alpha}}}$ $\qquad l_{q''} = 3.40431361276445 \times 10^{-16}\,\text{m}$ 51)

$$r_p = 2.10308932236977 \times 10^{-16}\,\text{m}$$

Finally, $\frac{l_{q''}}{r_p} = 1.61872041123221$ 52)

where the golden ratio is given as: $\Phi_{Golden} := \frac{1 + \sqrt{5}}{2}$ $\qquad \Phi_{Golden} = 1.61803398874989$ 53)

Finally, $\frac{l_{q'}}{l_{q''}} = 68.5179947466651$ which is 1/2 of 1/alpha. 54)

The magnetic force equation above can be restated as shown below in terms of the power constant.

Where: $f_{FQK} := 3.809435813 \cdot 10^{14} \cdot Hz$ = Fundamental Force Constant Frequency. 55)

$$t_x := \left[f_{FQK} \cdot \alpha^2 \cdot \left(16 \cdot \pi^2\right)^{-1} \right]^{-1} \qquad t_x = 7.78445742626872 \times 10^{-9} \, sec$$ 56)

$$f_x := t_x^{-1} \qquad f_x = 1.28461104639803 \times 10^{8} \, Hz$$ = Basic EG magnetic frequency at n1 H1 atom. 57)

Then: where, $\phi = 92.8844191676145 \, deg$ Note: $\frac{f_{IQK}}{4 \cdot \pi} \cdot \alpha^2 = 1.28461103546489 \times 10^{8} \, Hz$

[---------A-Vector---------]

$$F'_{EM} := \left[\left[\left(\frac{q_o \cdot v_{LM} \cdot \sin(\phi)}{l_q} \right) \cdot \mu_o \right] \cdot \frac{q_o}{t_x} \right] \quad \text{or,} \quad F'_{EM} = 1.25459314906271 \times 10^{-22} \, newton$$ 58)

Making t_x very large would effectively eliminate not only magnetic forces, but the related electrogravitational force as well. Making t_x smaller increases both of the related forces. This, by the reason that the electrogravitational force depends on the existence of at least two local space A vector systems connected through non-local energy space via the force or power constants as shown above.

There is a direct link to the length of the Grand Gallery of the Great Pyramid of Egypt at Giza where the Grand Gallery length is arrived at by dividing the nuclear force at the n1 energy state of the hydrogen atom into the energy represented by the hyperfine radiation frequency f_{H1} as shown below.

$$\lambda_{NMH1} := \frac{h \cdot f_{H1}}{F_{NM}} \qquad \text{where,} \qquad \frac{\lambda_{NMH1}}{3} = 1.84641633800068 \times 10^{3} \, in$$ 59)

The actual measured length of the roof is given as: $L_{GG} := 1844.5 \cdot in$ $\quad \frac{\lambda_{NMH1}}{L_{GG} \cdot 3} = 1.00103894714052$ 60)

The 1/3 wavelength of the Grand Gallery corresponds to an angle of 120 degrees which is the angle between the two oxygen molecules attached to the hydrogen atom for the common water molecule. The angle of 120 degrees also applies to the power constant in the equations above since twice the atan the square root of 3 also is equal to 120 degrees.

Christopher Dunn in his book "The Giza Powerplant"[5] suggests that the hyperfine frequency was utilized in a hydrogen gas environment in the King's Chamber and Grand Gallery to build a microwave energy to tremendous levels.

The field may not be the 'medium' that transfers the force mechanism between particles but rather may act as wave function potentials in space that define where the particle most likely is. The fields may transfer changes in relative position between particles in local space at the velocity of light but the actual force may occur between the centers of the particles through non-local energy space instantly. Then further, changes in a magnetic or electric field relative to the change of locations of the parent local space charged particles will cause electromagnetic radiation at the speed of light which is a loss in the potential energy of the field. The loss in the field energy must be made up by injection of energy from energy space. Then the increase in energy of the universe over time will occur due to acceleration of charge and matter since all matter is composed of discrete charges that form the atoms that form up matter.

This local space field energy loss is made up by a shift between the phase of the the two most important energy input time controls, the Plank time and the Compton refresh time. The non-local input energy establishes a new steady state field once the charged particle is no longer accelerated. This is analogous to the difference in phase lead or lag of any system of commercial power generation between the power grid and the generator.

The steady state electric and magnetic fields can be considered as being potentials. The magnetic field in terms of the magnetic vector potential A and the electric field as voltage potential, ϕ. There is no rest mass in these field potentials but when they change per unit time, they interact to form electromagnetic radiation which has momentum but again, no rest mass since 'rest' cannot be considered as a possibility.

The action product of the first term of the weak, electric or strong force equations with the first term of the magnetic or electrogravitational equations is shown immediately below as:

(A_E)	**(A_B)**	==> E and B field potentials
variable	variable	
volt*meter/sec	volt*sec/meter	

$$\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot\left(\frac{\mu_o\cdot i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\Delta r_x}\right) = 6.01209178959621\times10^{-17}\,\text{volt}^2 \qquad 61)$$

where, $A_{EQ} := \left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot q_o$ $\quad A_{EQ} = 3.72429510842518\times10^{-19}\,\text{m}\,\text{s}^{-1}\,\text{joule}$ 62)

and $A_{BQ} := \left(\frac{\mu_o\cdot i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\Delta r_x}\right)\cdot q_o$ $\quad A_{BQ} = 4.14383716085914\times10^{-36}\,\text{kg}\,\text{m}\,\text{s}^{-1}$ 63)

Then: $f_{EB} := \frac{(A_{EQ}\cdot A_{BQ})^{0.5}}{h}$ $\quad f_{EB} = 1.87485205692152\times10^{6}\,\text{Hz}$ 64)

Where, $\frac{f_{EB}}{\alpha\cdot2} = 1.28461103386923\times10^{8}\,\text{Hz}$ **Note: See nearly exact agreement with $1/t_x$ above.**

Ratio $f_{EB}/(\alpha*2)$ from above to f_x is:

$\frac{f_{EB}}{\alpha\cdot2\cdot f_x} = 0.999999990247003$ $\quad$ where, $\frac{1}{t_x} = 1.28461104639803\times10^{8}\,\text{Hz}$ 65)

It is obvious that f_{EB} has a direct connection via the fine structure constant to f_x which is the electrogravitational and thus even the energy space connection in the n1 energy level of the Hydrogen atom. Note that f_{EB} is slightly above the upper limit of the AM broadcast band of commercial broadcast radio.

Stimulating Hydrogen gas with the f_{EB} frequency as for f_x above may also change the energy in the gas so as to reveal a change in the gravitational attraction as measured by a bulk weight change of a suitable volume of the gas.

Next, the five forces are presented in terms of the Compton dimensions of the proton as a check on the established force ratios between the electromagnetic, the weak and finally the strong force ratios.

Let: $\lambda_{prot} := 1.321409993 \cdot 10^{-15} \cdot m \qquad \Delta r_x := \frac{\lambda_{prot}}{2 \cdot \pi}$ 66)

<u>The five forces</u> summarized from the ebook, "Electrogravitation As A Unified Field Theory", by Jerry E. Bayles.

<u>Electrogravitational force</u>

(A) variable volt*sec/meter |---------constant newton---------| (amp) (amp) (A) variable volt*sec/meter

$$F_{EG} := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \qquad 67)$$

Note: (A) = volt * sec / m = weber/m $\qquad F_{EG} = 1.25546239918455 \times 10^{-39} \, newton \cdot \frac{henry}{m} \cdot newton$

<u>Magnetic force</u>

(A) (amp)

$$F_{EM} := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \qquad 68)$$

= Newton units.

$F_{EM} = 3.16079931897164 \times 10^{-17} \, newton \qquad \frac{F_{EM} \cdot \Delta r_x}{h} = 10.0322480446878 \, Hz$

<u>Weak force</u>

(-------------------------------------- F_{EE} --------------------------------------)

(Volt*m/sec) (------------- Watt Constant -------------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{EW} := \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \left[(3) \cdot \sqrt{\frac{\mu_o}{\varepsilon_o}}\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right)\right] \cdot \left[\frac{(\pi)^2}{\varepsilon_o}\right] \cdot \left(\frac{\mu_o \cdot i_{LM}^{\,2} \cdot \lambda_{LM}^{\,2}}{4 \cdot \pi \cdot \Delta r_x^{\,2}}\right) \qquad 69)$$

$$F_{EW} = 4.30576757785795 \, A^{-2} \left(\frac{volt^2 \cdot m^2}{sec^2}\right) \cdot watt^3$$

Where, $\left[\frac{(\pi)^2}{\varepsilon_o}\right] \cdot \left(\frac{\mu_o \cdot i_{LM}^{\,2} \cdot \lambda_{LM}^{\,2}}{4 \cdot \pi \cdot \Delta r_x^{\,2}}\right) = 4.72087067687524 \times 10^{-4} \, A^{-2} \, watt^2$ 70)

Electrostatic force

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec)

$$F_{EE} := \left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right) \quad 71)$$

$$F_{EE} = 5.26584234200988\times10^{3}\left(\frac{volt^2\cdot m^2}{sec^2}\right)\cdot watt$$

where, $$\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x} = 5.84893708755659\times10^{5}\,\frac{volt\cdot m}{sec} \quad 72)$$

and $$\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right] = 1.53926697703375\times10^{-8}\,watt \quad 73)$$

Strong force

(------------------------------------ F_{EE} ------------------------------------)

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{ES} := \left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\cdot\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\sqrt{\frac{3\cdot\mu_o}{\varepsilon_o}}\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\varepsilon_o\cdot\Delta r_x}\right)\right]\cdot\left(\frac{2\cdot\pi\cdot R_{n1}}{\varepsilon_o\cdot\Delta r_x}\right)\cdot\left(\frac{\mu_o\cdot i_{LM}^{2}\cdot\lambda_{LM}^{2}}{4\cdot\pi\cdot\Delta r_x^{2}}\right)^{2} \quad 74)$$

$$F_{ES} = 3.98211249425235\times10^{5}\,A^{-2}\left(\frac{volt^2\cdot m^2}{sec^2}\right)\cdot watt^{3}$$

$$\frac{F_{ES}}{F_{EW}} = 9.24832198265888\times10^{4}$$ Very close to 100,000 times. 75)

$$\frac{F_{ES}}{F_{EE}} = 75.6215669900298\,m^2\,s^{-2}\,A^{-2}\,newton^{2}$$ Ballpark 100 times. 76)

The above force ratios are very close to the actual measured ratios.

The following excerpt in part is from: The Mathcad®† Electronic Book for *Introduction to Electromagnetic Fields*, 3/e C.R. Paul, K.W. Whites and S.A. Nasar, McGraw-Hill, 1998. This is a free book and was provided for a single user. The example below has the input parameters adjusted to display electrogravitational parameters that are associated with the web site http://www.electrogravity.com by Jerry E. Bayles.

Example 7.5

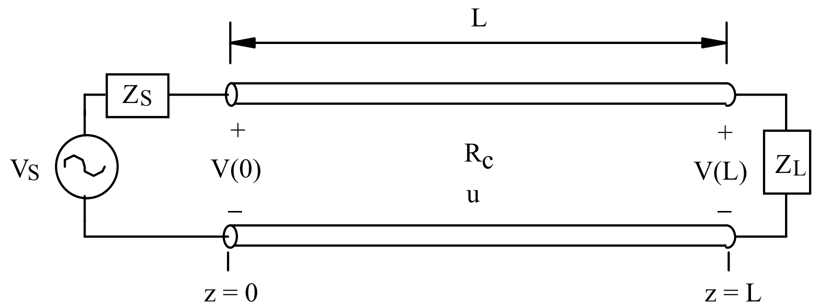
Sinusoidal Voltage and Current Waves on a Lossless Transmission Line

Purpose

To compute and visualize the voltage and current on a lossless transmission line (TL) that is driven by a sinusoidal voltage source. Once the functions for the voltage and current have been obtained, phasor-domain plots of the voltage and current are generated. These are followed by animated plots of the voltage on the TL as well as the forward and reverse propagating voltage waves. The concept of a standing wave is also discussed.

Enter the voltage source and transmission line parameters

A pictorial representation of the lossless transmission line (TL) is shown in Fig. 7.21a in the text and in the figure below:



Choose the parameters for the TL including its length, characteristic resistance and its propagation velocity:

$L_{nom} := 8.514995416 \cdot 10^{-03}$ — Nominal EG Length of the TL (m).

$R_C := ZR_C$ — TL test adjustable characteristic resistance (Ω).

$u := 8.542454612 \cdot 10^{-2}$ — Propagation velocity (m/s).

Now choose the parameters for the source and the load:

$V_S := 2.074502973 \cdot 10^{-14} \cdot \exp(j \cdot \Theta \cdot deg)$ — Phasor open-circuit source voltage (V).

$f := 1.003224805 \cdot 10^{01}$ — Source frequency (Hz).

$Z_S := 0 + ZS$ — Source impedance (Ω).

$Z_L := 0 + ZL$ — Load impedance (Ω).

Compute the radian frequency, ω, the period, T_p, and phase constant, β, of the voltage and current waves on this TL:

$\omega := 2\cdot\pi\cdot f$ $L := L_{adj}$ Where: $L = 4.25754323294862 \times 10^{-3}$ m

$T_p := \frac{1}{f}$ $T_p = 0.099678556093916$ (s) $\beta := \frac{\omega}{u}$ $\beta = 737.896499411229$ (rad/m)

Note that: $\left(\frac{2\cdot\pi}{\beta\cdot\frac{rad}{m}}\right)\cdot(f\cdot Hz) = 0.08542454612\,m\,s^{-1}$ **which is the square root of the fine structure constant in the units of meter per second.** 77)

Determine functions for the voltage and current everywhere on the TL

The first step in this analysis of this TL is to develop the expression for the voltage and current everywhere on the TL. Using Equation (66) in Chap. 7 of the text, the voltage reflection coefficient at the load is:

$\Gamma_L := \frac{Z_L - R_C}{Z_L + R_C}$ $\Gamma_L = 1.000000000i \times 10^{0}$ 78)

The (generalized) voltage reflection coefficient is given in (68) of Chap. 7:

$\Gamma(z) := \Gamma_L \cdot \exp[j\cdot 2\cdot\beta\cdot(z - L)]$ 79)

from which we can compute the reflection coefficient at the input to the TL as:

$\Gamma(0) = 6.718818986 \times 10^{-5} + 9.999999977i \times 10^{-1}$ 80)

Using $\Gamma(0)$, the input impedance looking into the TL at z = 0 is then from (62) of Chap. 7:

$Z_{in} := R_C \cdot \frac{1 + \Gamma(0)}{1 - \Gamma(0)}$ $Z_{in} = 1.1194519964 \times 10^{-14} + 2.5814539974i \times 10^{4}$ (Ω) 81)

In this worksheet, we wish to determine the voltage and the current everywhere on the TL. The expressions for the voltage and current are given in (60) of Chap. 7 of the text:

$V(V_{m\_plus}, z) := V_{m\_plus} \cdot \exp(-j\cdot\beta\cdot z)\cdot(1 + \Gamma(z))$ $I(V_{m\_plus}, z) := \frac{V_{m\_plus}}{R_C}\cdot\exp(-j\cdot\beta\cdot z)\cdot(1 - \Gamma(z))$ 82)

What remains to be determined is the constant V_{m_plus}. As discussed in Example 7.5, this constant can be found by applying the boundary conditions for the voltage at the input to the transmission line. The result of this analysis is that:

$V_{in} := \frac{Z_{in}}{Z_{in} + Z_S}\cdot V_S$ $V_{in} = 3.087704351 \times 10^{-10}$ (V) 83)

$V_{m\_plus} := \frac{V_{in}}{1 + \Gamma(0)}$ $V_{m\_plus} = 1.543852175 \times 10^{-10} - 1.543748450i \times 10^{-10}$ (V) 84)

The highlighted values above can be compared to the corresponding quantities in Example 7.5.

This completes the solution for this sinusoidal excitation of the lossless TL. The voltage and current can now be computed anywhere on the TL from the functions $V(V_{m\_plus},z)$ and $I(V_{m\_plus},z)$, respectively, which are defined above.

Plot the phasor voltage and current

We will now plot the magnitude and phase of the (phasor) voltage and current everywhere on the TL. Choose the number of points at which to plot the voltage and current:

$npts := 80$ Number of points to plot in z.

$z_{start} := 0$ $z_{end} := L$ z starting and ending points (m).

Construct a list of z_i points at which to plot the voltage and current:

$$i := 0 .. npts - 1 \qquad z_i := z_{start} + i \cdot \frac{z_{end} - z_{start}}{npts - 1} \tag{85}$$

Compute the voltage and current magnitude and phase at every position z_i along the TL:

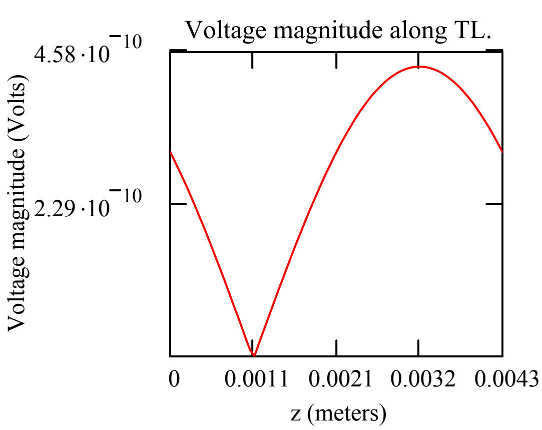
$Mag_{V_i} := \left|V\left(V_{m\_plus}, z_i\right)\right|$ Voltage magnitude (V). $max_V := max\left(Mag_V\right)$ $min_V := min\left(Mag_V\right)$

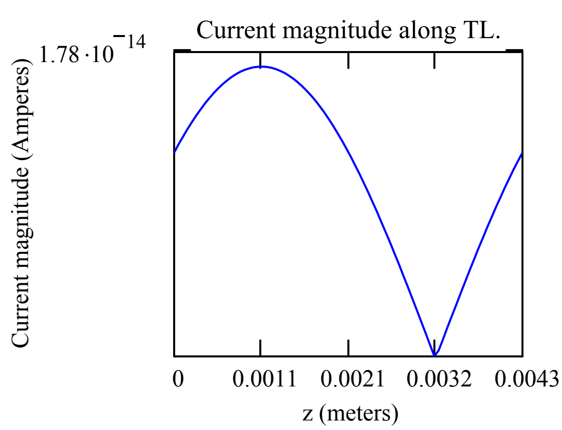
$Mag_{I_i} := \left|I\left(V_{m\_plus}, z_i\right)\right|$ Current magnitude (A). $max_I := max\left(Mag_I\right)$ $min_I := min\left(Mag_I\right)$

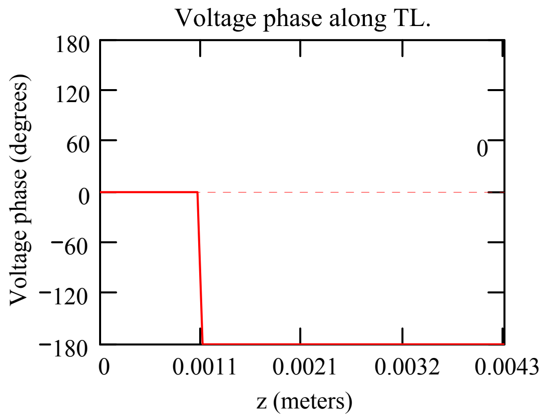
$$\Theta_{V_i} := if\left(\left|V\left(V_{m\_plus}, z_i\right)\right| \neq 0, \frac{arg\left(V\left(V_{m\_plus}, z_i\right)\right)}{deg}, 0\right) \quad \text{Voltage phase (°).} \tag{86}$$

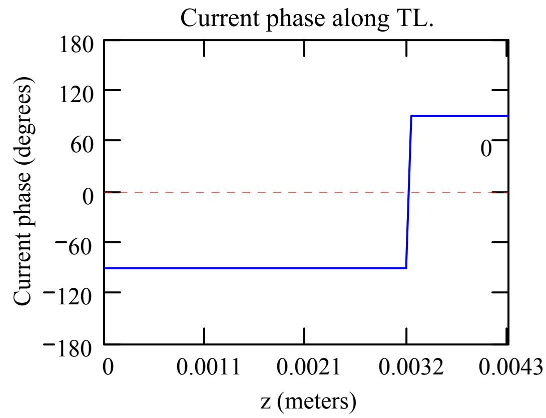
$$\Theta_{I_i} := if\left(\left|I\left(V_{m\_plus}, z_i\right)\right| \neq 0, \frac{arg\left(I\left(V_{m\_plus}, z_i\right)\right)}{deg}, 0\right) \quad \text{Current phase (°).} \tag{87}$$

Now plot the magnitude and phase of the voltage and current along the TL:









The source end of the TL is at the left in all of these plots. It is quite clear from these plots that the voltage and current are both functions of position and vary (periodically) along the TL for the parameters given in Example 7.5.

Check the terminal boundary conditions

We can check that the ratio of the voltage and current at the input to the TL and at the load end satisfy the boundary conditions:

$$Z(z) := \frac{V(V_{m\_plus}, z)}{I(V_{m\_plus}, z)}$$ Total impedance at position z along the TL (Ω). 88)

At the input to the TL (z = 0), Z(0) must equal Z_{in} as computed earlier in this worksheet:

$Z(0) = 2.581453997i \times 10^4$ (Ω) $Z_{in} = 2.581453997i \times 10^4$ (Ω) 89)

which it does. At the load end of the TL, Z(L) must equal the load impedance as chosen at the beginning of the worksheet:

$Z(L) = 2.581280560i \times 10^4$ (Ω) $Z_L = 2.581280560i \times 10^4$ (Ω) 90)

which it does. These checks give us an increased confidence that the analysis of the TL is correct.

Animated plot of the voltage

With the analysis of the TL voltage and current completed, we will now generate an animation clip of the time and spatial variation of the voltage on the TL for the sinusoidal source voltage.

The time-domain voltage everywhere on the transmission line can be computed from the phasor-domain form as:

$$V_t(V_{m\_plus}, z, t) := \mathrm{Re}(V(V_{m\_plus}, z) \cdot \exp(j \cdot \omega \cdot t))$$ 91)

Charting Note:

$V_{max} := \left|V_{m\_plus} \cdot \left(1 + \left|\Gamma_L\right|\right)\right|$

$V_{max} = 4.36652668250623 \times 10^{-10}$

$To := n_{pts\_per\_period} \cdot n_{periods}$

Choose the number of time periods to plot the voltage:

$n_{periods} := 3$ Number of time periods to plot.

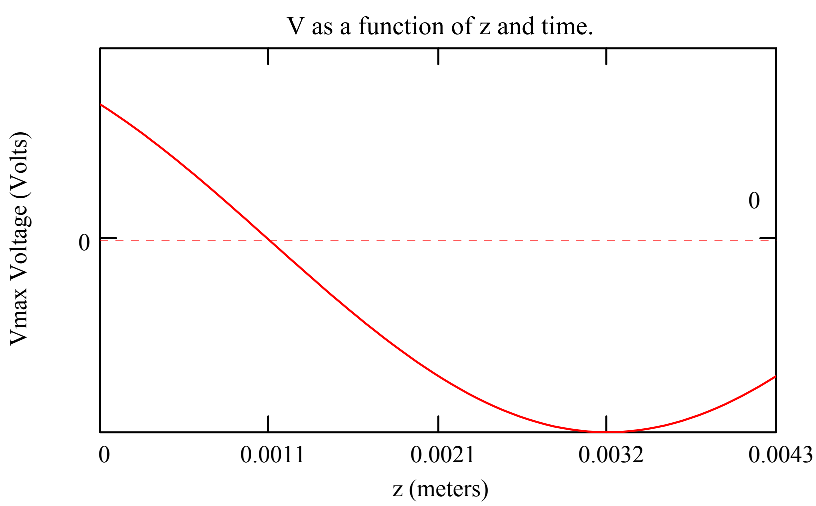
$n_{pts\_per\_period} := 20$ Number of points to plot per period.

$t_{start} := 0$ $t_{end} := n_{periods} \cdot T_p$ Time to start and end plot (s).

Define the variable time in terms of the constant FRAME:

$$t_{inc} := \frac{T_p}{n_{pts\_per\_period}} \qquad time := t_{start} + FRAME \cdot t_{inc}$$

Now generate the animated plot of the voltage on the TL. For best results, in the "Animate" dialog box, choose $To = 60$



Time (in periods, T_p)

$$\frac{time}{T_p} = 0.00$$

This voltage exists on a TL with $L = 4.25754323294862 \times 10^{-3}$ (m), $R_C = 2.58128056 \times 10^{4}$ (Ω) and $Z_L = 2.5812805601 \times 10^{4}$ (Ω). The voltage source is located at the left-hand edge and the load at the right-hand edge of this plot.

We can see in the animation that the voltage *amplitude* increases to some value and then decreases to another value as the voltage propagates towards the load. Furthermore, the period of this oscillation is one half that of the voltage source. This behavior of the total voltage on the TL is due to the interference of the forward (+z) and reverse (-z) propagating voltage waves. This "pulsation" of the voltage wave is entirely equivalent to interfering plane waves as illustrated in the **Example 6.8** worksheet and discussed in Section 6.7 of the text. We shall see later in Section 7.3.2 of the text that it is possible to **compute** the *ratio* of these maximum and minimum voltage amplitudes in terms of only the load reflection coefficient. (This ratio is called the voltage standing wave ratio or **VSWR** for short.)

Even though there is interference of the forward and reverse propagating voltage waves, in a real load situation, there is still net motion of the combined wave towards the load which can also be shown in the animation clip. This is due to the fact that net energy is being delivered to the load and subsequently dissipated as heat in the load impedance.

You may wish to experiment with other load impedances and observe the effect on this voltage wave. Particularly notable cases include: $Z_L = R_C$, $Z_L = 0$ and $Z_L = 10^6$ (an open-circuit load). In the first case, you will observe that the "pulsation" of the wave has disappeared entirely. Can you explain why? In the latter two cases, you will observe that while the voltage wave still "pulsates", there is **no net motion** of the voltage wave to the left or to the right. Does this make sense? Also observe that the minimum voltage *amplitude* is zero for these two cases. This will be of use to you later in Sections 7.3.1 and 7.3.2 of the text.

Animate forward, reverse and total voltage waves

The total voltage everywhere on the TL that we observed in the last animation clip is actually the sum of **forward and reverse** propagating waves. That is, a sum of a voltage wave that is traveling towards the load (the "forward" wave) and another wave that is traveling towards the source (the "reverse" wave). The final plot we will generate in this worksheet is an animation clip illustrating these two component waves as well as their sum.

From (56a) in Chap. 7 of the text, the phasor form of the total voltage at any point on the TL is the sum of the forward and reverse propagating waves as:

$$V(z) = V_m^+ e^{-j\beta z} + V_m^- e^{+j\beta z} \qquad 92)$$

We have previously determined the constant V_{m_plus}. To find the constant V_{m_minus}, we apply the boundary condition (64), from Chap. 7 of the text, at the load such that:

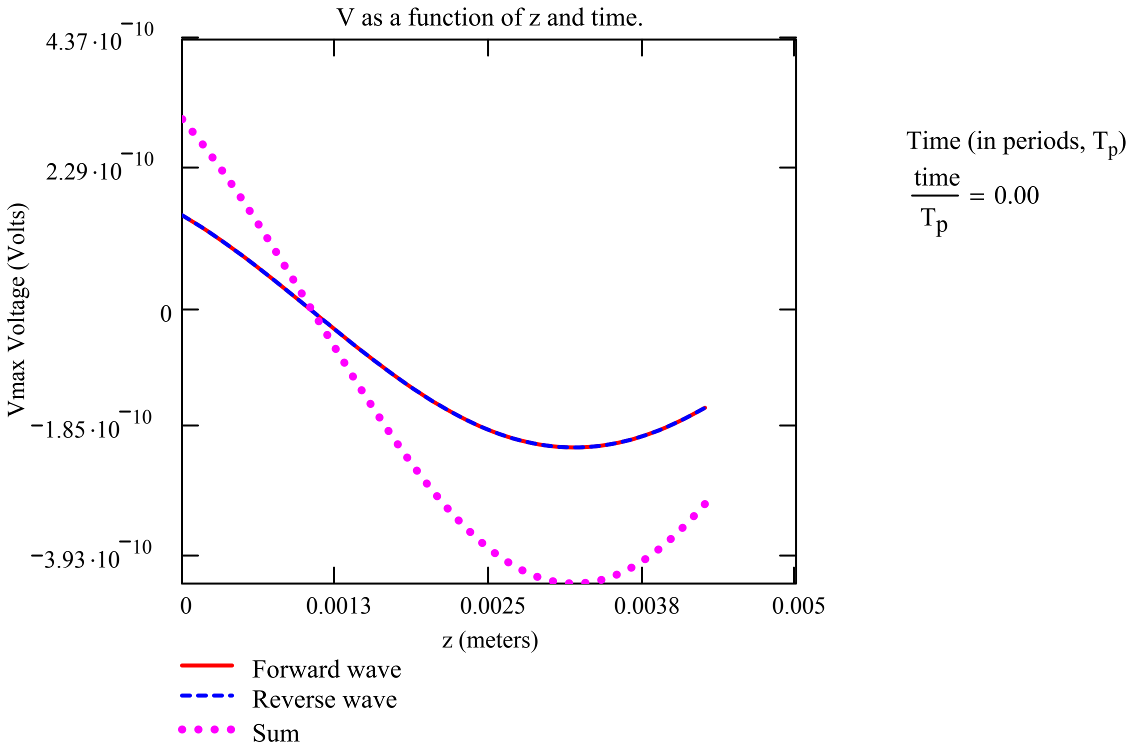
$$V_{m\_minus}(V_{m\_plus}) := \Gamma_L \cdot V_{m\_plus} \cdot \exp(-j \cdot 2 \cdot \beta \cdot L) \qquad 93)$$

Therefore, the time-domain forms of the forward and reverse propagating waves are, respectively:

$$V_{t\_forward}(V_{m\_plus}, z, t) := \mathrm{Re}(V_{m\_plus} \cdot \exp(-j \cdot \beta \cdot z) \cdot \exp(j \cdot \omega \cdot t)) \qquad 94)$$

$$V_{t\_reverse}(V_{m\_plus}, z, t) := \mathrm{Re}(V_{m\_minus}(V_{m\_plus}) \cdot \exp(j \cdot \beta \cdot z) \cdot \exp(j \cdot \omega \cdot t)) \qquad 95)$$

Now generate the animated plot of the voltage on the TL. For best results, in the "Animate" dialog box, choose To = 60

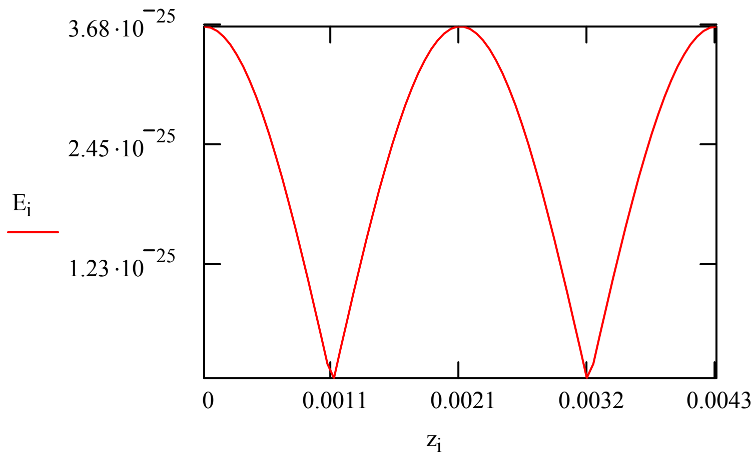


This voltage exists on a TL with $L = 4.25754323294862 \times 10^{-3}$ (m), $R_C = 2.58128056 \times 10^{4}$ (Ω) and $Z_L = 2.581280560 \times 10^{4}$ (Ω) where the voltage source is located at the left-hand edge of this plot and the load at the right-hand edge.

This animation clip is particularly informative in that we can see quite clearly that the solid line is a voltage wave propagating to the right (towards the load) while the dashed line is propagating to the left (towards the source). The sum of these two waves is the dotted line which is the total voltage everywhere on the TL as a function of time. This sum waveform is identical to the voltage waveform that was animated in the previous section of this worksheet. You can compare these two plots either as separately running animation clips or at the initial time at which the animation begins.

If you carefully observe this animation clip, you can develop a deep appreciation for why the voltage on the TL increases to its maximum amplitude at one time instant and then decreases to its minimum amplitude at another time (with these two times separated by $T_p/2$). The maximum amplitude of the voltage wave occurs when the forward and reverse waves add "in phase" while the minimum amplitude occurs when these two waves add "out of phase". This statement should be very clear when you view the animation clip! Enjoy!

$t := \frac{1}{f}$ **Then, energy along the transmission line is:** $E_i := Mag_{V_i} \cdot Mag_{I_i} \cdot t$



$h := 6.626075500 \cdot 10^{-34}$ Joule-Seconds (Plank's Constant.)

$Esum := \left(\int_{0 \cdot t}^{1 \cdot t} Mag_V \cdot Mag_I \cdot t \, dt \right)$ Power times time = Energy 96)

$Esum = 9.41171575276097 \times 10^{-25}$ J

$fsum := \frac{Esum}{h}$ $fsum = 1.42040575190563 \times 10^{9}$ Hz

$f_{H1} := 1.420405751786 \cdot 10^{9}$ H z empirical value.

Global constant adjustments: (Control of input parameters on page 1 above.)

$\alpha \equiv 7.297353080 \cdot 10^{-03}$ Fine structure constant.

$ZR_C \equiv 2.581280560 \cdot 10^{04}$ TL characteristic impedance.

$ZS \equiv j \cdot \left(-2.581280560 \cdot 10^{04}\right)$ Capacitor X_C

$ZL \equiv j \cdot \left(2.581280560 \cdot 10^{04}\right)$ Inductor X_L $\Theta \equiv 0$ deg

$ZR_C = 2.58128056 \times 10^{4}$ $ZS = -2.58128056i \times 10^{4}$ $ZL = 2.58128056i \times 10^{4}$

T L adjust to 16 digits of accuracy. Without the H1 wavelength, no limit to energy with accuracy.

Micro-fine L adjust for H1 hyperfine frequency.

$$L_{adj} \equiv \frac{8.514995412219695 \times 10^{-3} + 9.105367754 \cdot 10^{-8} \cdot 1}{2} \quad \text{meter} \qquad 97)$$

$fsum = 1.42040575190563 \times 10^{9}$ $\qquad f_{H1} = 1.420405751786 \times 10^{9}$

$4.552683877 \times 10^{-8}$ meter full-wave where $4.552683877 \times 10^{-8}$ meter is

very close to $(1/\alpha)$ of the n1 wavelength of the H1 atom. (0.9991986136).

$9.105367754 \cdot 10^{-8}$ meter half-wave where $9.1011372 \cdot 10^{-8}$ meter is

very close to $(1/\alpha)$ times 2 of the n1 wavelength of the H1 atom. (0.9991986136 also).

With the source, load and line Z equal to 1/2 the free space Z for the input parameters at the above p.1 beginning inputs, the quantum energy result is equal to 1/2 the King's chamber resonance of the Great Pyramid at Giza. The line length is set at a quarter wavelength of the quantum electrogravitational wavelength, or

$\frac{L}{4} = 1.064385808237155 \times 10^{-3}$ meter.

If the Esum integral above is taken over two time periods and the source, input and load Z's are are real at the Quantum Hall ohm value, then the frequency fsum is very close to the electrogravitational value $f = 10.03224805$ Hz.

If conjugate ZL and ZC loads with zero real ohms (pure conjugate reactances) are assumed, energy gain is proportional to the adjusted length accuracy of half-wave multiples of the line related to L above. Without the added H1 wavelength, it is possible that energy could tend to infinity if the line length was at the required accuracy.

If non-conjugate loads are assumed, the power is close to that of of electrogravitation for a one electron system. The input voltage is that obtained from multiplying the quantum magnetic fluxoid by the electrogravitational frequency f above in all cases. The energy gain is contained in the standing waves in the line during resonance when the line input capacitive reactance matches the load inductive reactance. The energy gain increases as the line Z, the input Z and the load Z go down.

$m_e := 9.109389700 \cdot 10^{-31} \cdot kg$ $\Phi_o := 2.067834610 \cdot 10^{-15} \cdot weber$ $q_o := 1.602177330 \cdot 10^{-19} \cdot coul$

$\mu_o := 4 \cdot \pi \cdot 1 \cdot 10^{-07} \cdot henry \cdot m^{-1}$ $\varepsilon_o := 8.854187817 \cdot 10^{-12} \cdot farad \cdot m^{-1}$ $dl := \dfrac{e \cdot m}{1.011}$ $dl = 2.68870606177947\ m$

$t := 3.892228717 \cdot 10^{-09} \cdot sec$ $r := \dfrac{dl}{2 \cdot \pi}$

$E_{start} := \Phi_o \cdot t^{-1} \cdot (dl)^{-1}$ $E_{start} = 1.97594167488423 \times 10^{-7} \dfrac{volt}{m}$

Establish an electric charge that exists in the field itself as shown below. (Gauss's law for the electric field.)

$Q_{fld} := \varepsilon_o \cdot \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} E_{start}\, dr\, dr$ field charge: $Q_{fld} = 1.60184234978999 \times 10^{-19}\ s\,A$ 98)

Note: Derivation of Q Based on Q = CV.

$I_{enc} := \dfrac{Q_{fld}}{t}$ $I_{enc} = 4.11548875016942 \times 10^{-11}\ amp$ i.e. $farad \cdot volt = 1\ s\,A$ 99)

$mass_{fld} := \dfrac{Q_{fld}}{q_o} \cdot m_e$ $mass_{fld} = 9.10748512600706 \times 10^{-31}\ kg$ 100)

$E_{fld} := \dfrac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}}$ $E_{fld} = 1.00907935374919 \times 10^{6}\ volt \cdot m^{-1}$ Note: Also based on Q = CV. 101)

The standard Amperian-Maxwell law defines the **A** vector in terms of magnetic fixed flux and changing electric field flux as shown below.

Closed Field **Open Field** **E** is 90 degrees to the **B** field.

$$\int_{0 \cdot 2 \cdot \pi \cdot r}^{2 \cdot \pi \cdot r} B\, dl = \mu_o \cdot \left(I_{enc} + \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} E_{fld}\, dr\, dr \right)$$ Where: $E_{fld} = \dfrac{mass_{fld} \cdot dl}{t^2 \cdot Q}$ 102)

The A vector is the basis for:

E_{fld}

$$\mu_o \cdot \left[I_{enc} + \pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr \right] = -1.65944304228449 \times 10^{-3} \frac{volt \cdot sec}{m}$$ 103)

Momentum

$$Q_{fld} \cdot \left[\mu_o \cdot \left[I_{enc} + \pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr \right] \right] = -2.65816614219563 \times 10^{-22}\ kg\,m\,s^{-1}$$ 104)

Force

$$\frac{d}{dt} \left[Q_{fld} \cdot \left[\mu_o \cdot \left[I_{enc} + \pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr \right] \right] \right] = 2.04882575161885 \times 10^{-13}\ newton$$ 105)

$f := t^{-1}$ $\qquad f = 2.56922209024439 \times 10^{8}\,\text{Hz}$

Equation Check:

$$B := \frac{d}{dr}\mu_o \cdot \left[I_{enc} + \pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr \right] \qquad B = -7.75584084076737 \times 10^{-3}\,\text{tesla} \tag{106}$$

$$\int_{0 \cdot r}^{1 \cdot r} B\, dr \cdot \frac{1}{2} = -1.6594430422846 \times 10^{-3}\, \frac{\text{volt} \cdot \text{sec}}{\text{m}} \qquad = \mathbf{A\ vector} \tag{107}$$

Note that the free field displacement current is given below as:

$$\pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr = -1.32054281479519 \times 10^{3}\,\text{amp} \tag{108}$$

which is much larger than the beginning fixed field current $I_{enc} = 4.11548875016942 \times 10^{-11}\,\text{amp}$ **as well as being negative which suggests negative time since the input charge above is positive**. There is no heating effect if the field is in free space devoid of a dielectric. The smaller the time the greater the current and thus the greater the force. A change of a power of 10 in time will result in a change of a thousand in the **B** field and a change of 10,000 in the force field above.

An excellent example of the Ampere-Maxwell law is given on page 84 of the book titled "A Student's Guide To Maxwell's Equations," by Daniel Fleisch, 5th. printing 2009 by Cambridge University Press, New York.

In the above Ampere-Maxwell equation for the A-vector, time and space are of prime interest. In the force equation, the derivative with respect to time occurs twice as does the integral with respect to distance. I ask the reader to imagine a series arrangement of torus and capacitors such that the axis of the torus's point through metal rings that form capacitors and that his is repeated for multiple torus-capacitor sets. The first torus receives a current pulse that forms an A-vector through the middle of the torus. Then the capacitor at the output of the torus begins to charge and the A-vector is reinforced as it passes through the two rings forming the capacitor. The first ring is connected to the output side of the torus and the second ring is tied to ground or common. T second torus receives the building charge from the first capacitor and the sequence repeats to the end of the sets of torus-capacitor sets. This is identical to a pulse forming network or common coaxial cable except that the field is formed inline between the pulse forming elements.

As we saw above, a mass field can be formed by changing time and space parameters related to the A-vector.

$$\sqrt{\varepsilon_o \cdot \mu_o} \cdot Q_{fld} \cdot \left[\mu_o \cdot \left[I_{enc} + \pi \cdot \varepsilon_o \cdot \frac{d}{dt} \int_{0 \cdot r}^{1 \cdot r} \int_{0 \cdot r}^{1 \cdot r} \left(\frac{mass_{fld} \cdot dl}{t^2 \cdot Q_{fld}} \right) dr\, dr \right] \right] = -8.86668784076783 \times 10^{-31}\,\text{kg} \tag{109}$$

Then what is formed is a negative mass-field driver which can be used for propulsion in free space or even as a weapon when direct at a suitable target of interest. Negative mass would also provide negative gravitational force in a normal gravitational field as well as annihilation of ordinary matter when used as a weapon. The A-vector cannot be shielded against by ordinary shielding methods.

HubbleEGunits.mcd

$c := 2.997924580 \cdot 10^{08} \cdot m \cdot sec^{-1}$ $\quad yr := \left(3600 \cdot \frac{sec}{hr}\right) \cdot \left(24 \cdot \frac{hr}{day}\right) \cdot (365.25 \cdot day)$

$yr = 3.15576 \times 10^{7} sec$ $\quad ly := c \cdot yr$ $\quad ly = 9.4607304725808 \times 10^{15} m$

$parsec := 3.261564 \cdot ly$ $\quad Mparsec := 1 \cdot 10^{06} \cdot 1 \cdot parsec$ $\quad Mparsec = 3.08567779230725 \times 10^{22} m$

$H_0 := 70.8 \cdot \frac{km}{Mparsec \cdot 1 \cdot sec}$ $\quad H_0 = 2.29447158016653 \times 10^{-18} s^{-1}$

$D_c := \frac{c}{H_0}$ $\quad D_c = 1.30658605925396 \times 10^{26} m$ Radius of the universe. 110)

$\frac{D_c}{c} = 1.38106255435637 \times 10^{10} yr$ Age of the universe. 111)

Check: $H_0 \cdot D_c = 2.99792458 \times 10^{8} m\, s^{-1}$

It is of interest that the electrogravitational force constant times the Plank radius are very close in magnitude to the Hubble universe frequency H_0 times the plank constant h.

Statement of parameters:

$v_{LM} := \sqrt{7.297353080 \cdot 10^{-03} \cdot \left(m^2 \cdot sec^{-2}\right)}$ $\quad v_{LM} = 0.085424546121124 \frac{m}{sec}$ EG group velocity 112)

$m_e := 9.109389700 \cdot 10^{-31} \cdot kg$ Electron rest mass

$h := 6.626075500 \cdot 10^{-34} joule \cdot sec$ Plank constant

$\lambda_{LM} := h \cdot \left(m_e \cdot v_{LM}\right)^{-1}$ $\quad \lambda_{LM} = 8.51499541615052 \times 10^{-3} m$ EG wavelength

$f_{LM} := 1.003224805 \cdot 10^{01} \cdot Hz$ EG quantum wavelength.

$q_o := 1.602177330 \cdot 10^{-19} \cdot coul$ Least quantum charge.

$i_{LM} := q_o \cdot f_{LM}$ $\quad i_{LM} = 1.60734403946467 \times 10^{-18} amp$ EG least quantum current

$\mu_o := 1.256637061 \cdot 10^{-06} \cdot henry \cdot m^{-1}$ Permeability of free space.

$l_q := 2.817940920 \cdot 10^{-15} \cdot m$ Classic radius of the electron.

$G := 6.672590000 \cdot 10^{-11} \cdot newton \cdot m^2 \cdot kg^{-2}$ Universal gravitational constant.

The non-local electrogravitational force constant, which exists in all of the force fields is calculated as:

$$F_{FQK} := \left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\cdot\mu_o\cdot\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right) \qquad F_{FQK} = 2.96437144938831\times10^{-17}\,\text{newton} \qquad 113)$$

$$E_{H0} := H_0\cdot h \qquad E_{H0} = 1.52033419227877\times10^{-51}\,\text{joule} \qquad 114)$$

$$r_{EGH} := \frac{E_{H0}}{F_{FQK}}\cdot\left(\frac{\pi}{4}\right) \qquad r_{EGH} = 4.02806363086679\times10^{-35}\,\text{m} \quad \text{Finally,} \qquad 115)$$

$$r_P := \sqrt{G\cdot h\cdot c^{-3}} \qquad r_P = 4.05083315388068\times10^{-35}\,\text{m} \quad \text{Plank quantum radius.} \qquad 116)$$

Note the $\pi/4$ adjustment constant which is the inverse of the square root of the golden ratio.

It is demonstrated by the above calculations that the electrogravitational force constant and its electrogravitational wavelength and the included permeability of free space are dimensionally related directly to the Hubble energy constant and the least quantum plank radius.

The electrogravitational force constant is universal to all of the force fields and from it many other energy connections other than the Hubble frequency arise such as:

$$F_{FQK}\cdot\lambda_{LM}\cdot h^{-1} = 3.80943581208951\times10^{14}\,s^{-1} \qquad = \text{Force constant frequency } f_{FQK} \qquad 117)$$

$$F_{FQK}\cdot l_q\cdot(4\cdot\pi)^{-1} = 6.64744329581196\times10^{-33}\,\text{joule} \qquad = \text{Electrogravitational energy} \quad h\cdot f_{LM} \qquad 118)$$

It is also known that the gluon force is a constant such that if quarks were to be pulled apart, the energy would rise as a direct function of the distance of separation. I propose that the force constant related to gluons is also related directly to the above force constant F_{FQK}.

Then the very largest geometry of the universe is united at the very smallest in the quantum realm of the electron and the nuclear binding forces by the electrogravitational force constant F_{FQK} as well as all of the five field forces, the strong, electroweak, electric, magnetic, and the electrogravitational force fields. The so-called electromagnetic force is of coarse the combined electric and magnetic force fields when considered in terms of time varying fields and does not participate in the gravitational field of force in the Theory Of Electrogravitation..

Faraday Generator Test And Proof Of Concept

Jerry E. Bayles

March 18, 1010

Below is a link to further information concerning Bruce DePalma's N-Machine and his theories of unlimited energy space that supplies the energy to the machine. His ideas about energy space are in agreement with my own and visa-versa.

http://www.rexresearch.com/depalma/depalma.htm

What may be added to DePalma's theory is my concept of the least quantum electrogravitational velocity that must exist throughout all of space that is also intimately connected to the vector magnetic potential, commonly known as the A-Vector. Thus, there IS indeed an absolute frame of reference as opposed to Einstein's viewpoint of the opposite. That reference frame is the least quantum velocity equal to the square root of the fine structure constant in meter per second units and it is most likely connected to rotational motion, especially evident in the case of the faraday motor experiment involving a magnetic field.

The connection to the electrogravitational least quantum velocity occurs whenever a material 'system' of particles (or even one particle) exits in rotation about a central axis. The connection to energy space induces a parallel connection to energy space that induces a same vector momentum that fixes the direction of what is termed inertia by mainstream physics.

Mainstream physics must accept a least quantum velocity limit just as it has placed an upper limit of the velocity of light. It is this new concept that will allow for the production of limitless free energy as well as elecrogravitional propulsion and control of spacecraft.

The Faraday Disk Field

The field dynamics of the Faraday disk homopolar generator can be explained in a more straightforward manner if the established field near the magnet is considered to be nearly stationary relative to any motion of the magnetic disk that creates it.

Then the established field can be considered to be a stator field without the necessity of an actual physical stator being present. As a result, no invocation of relativity is necessary to explain the actions of the Faraday disk. Only the relative motion between the conductive surface of the axially magnetic disk in rotation through a nearly zero velocity magnetic field that is independent by its nature from the motion of the magnetic disk field is necessary.

The nearly zero velocity field is independent of the relative motion of the disk and as a result, the field is akin to the nature of the magnetic vector potential, also known as the A-vector. The famous Aharonov-Bohm experiment proved in a quantum level experiment that the A-vector exists apart from the totally shielded magnetic field that created it and further that the A-vector can affect the momentum of particles passing through its influence. This has been proven by many others since the original experiment.

Then A-vector moves slowly around the magnetic B field 90 degrees to the B-field vector. The cross product of the A-vector and the B-vector forms a pressure wave that moves outwards from the cylinder formed by the cross product of the A-vector and B-field vector. This pressure wave is also free energy.

Having the virtual stator field always near zero velocity relative to the motion of the magnet field that created it explains why there is no voltage generated in a Faraday disk if the disk is held motionless and the magnet disk is rotated. The virtual stator field is independent of the motion of the magnet disk that creates it since it is always nearly zero rotation velocity.

The near zero rotation velocity is also independent of radius from the axis of near zero rotation since it must be a constant in the least quantum sense fixed at the square root of the fine structure constant in meter per second units. Thus, there exists a lower limit of velocity associated with the quantum state of motion as well as the upper limit of velocity equal to the velocity of light in the large scale of matter. It is this lower limit of velocity that is key to the nature of not only the nature of the magnetic field but also the gateway to the electrogravitational action as detailed on my web site at:

http://www.electrogravity.com

The above fundamental explanation yields the how and why that the generators built by Bruce De Palma and others function. See:

N-Machine Tests:
http://jnaudin.free.fr/html/farhom.htm
http://www.rexresearch.com/kinchelo/kinche~1.htm

I do not envision our universe as being in a closed bottle energy-wise. The scientific empirical facts are present that the universe is filling with energy and as a result, expanding at the same time. Therefore, "As above, so below" applies in that the energy flowing in from quantum field actions related to the dynamics of the A-vector, B-vector and pressure fields as described above are the cause of the expansion of the universe.

FaradayDiskVoltTest.MCD

The voltage V between the inner radius r1 and the outer radius r2 of a Faraday acyclic (homopolar) generator is given by the following mathematical expression where B is the strength of the magnetic flux in webers/meter^2 and ω is the frequency of rotation in radians per second.

$$V = \omega \cdot \int_{r1}^{r2} B \cdot r \, dr \qquad \text{or:} \qquad V = \frac{1}{2} \cdot r2^2 \cdot \omega \cdot B - \frac{1}{2} \cdot r1^2 \cdot \omega \cdot B \qquad \text{Thus:} \qquad V = \frac{1}{2} \cdot \omega \cdot B \cdot \left(r2^2 - r1^2\right) \qquad 119)$$

A disk magnet diameter is selected if 2 inches with a center small diameter of 0.250 inches.

Let: $D_L := 2.0 \cdot in$ $\quad D_S := 0.25 \cdot in$ $\quad r2 := \frac{D_L}{2}$ $\quad r1 := \frac{D_S}{2}$ $\quad B := 5150 \cdot gauss$

$f1 := 51.667 \cdot Hz$ (For 3100 rpm) $\omega1 := 2 \cdot \pi \cdot f1$ in radians/second.

Then: $$V1 := \frac{1}{2} \cdot \omega1 \cdot B \cdot \left(r2^2 - r1^2\right) \qquad V1 = 0.053088243433719 \text{ volt} \qquad 120)$$

It is seen that the output voltage increases as the square of the difference of the inner and outer radius distance. If the internal resistance remains constant, then the output power increases as the square of the voltage over the internal generator resistance. The below surface resistance per disk is assumed as a larger than actually expected value.

Let: $Rg := 5 \cdot 10^{-05} \cdot ohm$ 50 micro-ohms. The actual Ω may be considerably less.

Then the power into a matched load impedance is:

1 disk: $Sg1 := \frac{V1^2}{2Rg}$ $Sg1 = 28.1836159087778\ watt$ 121)

The power for 1 disk can be expressed directly in terms of twice the radius as: $r3 := 2 \cdot r2$

or: $Sg2 := \frac{\left[\frac{1}{2} \cdot \omega 1 \cdot B \cdot \left(r3^2 - r1^2\right)\right]^2}{2 \cdot Rg}$ $Sg2 = 461.738378550838\ watt$ 122)

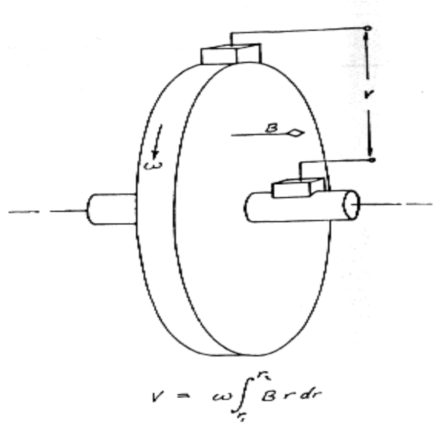
Doubling the radius multiplies the output by 16 times! $\frac{Sg2}{Sg1} = 16.3832199546485$ 123)

The power output changes as the fourth power of the radius difference between the inner and outer diameters and the square of both the magnetic flux strength B and the rate of angular velocity ω. This is not brought out in contemporary analysis of the Faraday Homopolar Generator.

The conclusion is obvious. Holding the rate of rotation constant, doubling the radius causes a power increase of 16-fold while the inertial forces on the disk increase only in a linear fashion as a direct function of the radius increase. Then it is possible to design a generator for commercial use of large diameter and thus very substantial power output at a fairly low rotation rate.

The power Sg into a short circuit must be dissipated by the surface area of the disk magnets. They may be placed in water for cooling if necessary.

Below is a figure copied from JLN Labs web site showing a single disk magnet configuration.



The inertial force on the magnet disk can be held as a constant while increasing the radius and still achieve increased power output as the following analysis will show.

InertialForceSum.MCD

$T := \frac{3}{8} \cdot in$ $Mass_{total} := 143 \cdot gm$ NdFeB Grade N42, Ni-Cu-Ni plating disk magnet.

$Vol_{total} := \pi \cdot \left(r2^2 - r1^2\right) \cdot T$ $Density := \frac{Mass_{total}}{Vol_{total}}$ $Density = 7.52476899104326 \times 10^3 \, kg \, m^{-3}$

$n := 1, 2 .. 100$ Range variable for incrementing the radius.

$r(n) := \frac{r2 - r1}{99} \cdot (n - 1) + r1$ Check: $r(1) = 0.125 \, in$ $r(100) = 1 \, in$

$\Delta vel(n) := 2 \cdot \pi \cdot f1 \cdot r(n)$ $\Delta Vol(n) := T \cdot \pi \cdot \left(r(n+1)^2 - r(n)^2\right)$ $\Delta M(n) := Density \cdot \Delta Vol(n)$

$$Force1_{total} := \sum_{n=1}^{100} \frac{\Delta M(n) \cdot \Delta vel(n)^2}{r(n)} \qquad Force1_{total} = 59.3367709755509 \, lbf \qquad 124)$$

= Inertial pounds of force radial (total).

Doubling the major radius to r3 while holding the frequency f constant:

$r(n) := \frac{r3 - r1}{99} \cdot (n - 1) + r1$ Check: $r(1) = 0.125 \, in$ $r(100) = 2 \, in$

$\Delta vel(n) := 2 \cdot \pi \cdot f1 \cdot r(n)$ $\Delta Vol(n) := T \cdot \pi \cdot \left(r(n+1)^2 - r(n)^2\right)$ $\Delta M(n) := Density \cdot \Delta Vol(n)$

$$Force2_{total} := \sum_{n=1}^{100} \frac{\Delta M(n) \cdot \Delta vel(n)^2}{r(n)} \qquad Force2_{total} = 476.124126931727 \, lbf \qquad 125)$$

= Inertial pounds of force radial (total).

The increase of inertial force is about 8 times by doubling the radius at a fixed rotation rate.

$$\frac{Force2_{total}}{Force1_{total}} = 8.02409903848506 \qquad 126)$$

Finally, holding the radius at the original beginning r1 radius and doubling the frequency:

$f2 := 2 \cdot f1 \qquad f2 = 103.334\ s^{-1}$

$r(n) := \frac{r2 - r1}{99} \cdot (n - 1) + r1$ Check: $r(1) = 0.125\ in$ $r(100) = 1\ in$

$\Delta vel(n) := 2 \cdot \pi \cdot f2 \cdot r(n) \qquad \Delta Vol(n) := T \cdot \pi \cdot \left(r(n+1)^2 - r(n)^2\right) \qquad \Delta M(n) := Density \cdot \Delta Vol(n)$

$$Force3_{total} := \sum_{n=1}^{100} \frac{\Delta M(n) \cdot \Delta vel(n)^2}{r(n)} \qquad Force3_{total} = 237.347083902204\ lbf \qquad 127)$$

= Inertial pounds of force radial (total).

$$\frac{Force3_{total}}{Force1_{total}} = 4$$

Faraday Disk Analysis Results:

Doubling the frequency yields four times the inertial pounds of force due to the square of the velocity parameter in the inertial force equation above. However, doubling the radius will yield a force increase somewhat less than but close to eight times. More importantly, doubling the radius will yield 16 times the power but less than eight times the inertial pounds of force. Obviously, simply increasing the radius while slowing the rate of rotation to keep the inertial force a constant will yield an increase in power output, all other parameters also being held constant.

Inertial Force Equalization With Increasing Radius And Net Power Gain Calculation:

Triple the major radius D_L and reduce the rate of rotation so that the inertial forces are equal.

Let: $D_L := 6.0 \cdot in \qquad D_S := 0.25 \cdot in \qquad r2 := \frac{D_L}{2} \qquad r1 := \frac{D_S}{2}$

$f3 := 9.9253 \cdot Hz \qquad \omega 3 := 2 \cdot \pi \cdot f3$ in radians/second. $\quad r2 = 3\ in \qquad r1 = 0.125\ in$

Density remains the same. $\quad Density = 7.52476899104326 \times 10^{3}\ kg\,m^{-3}$

$n := 1, 2 .. 100$ Range variable for incrementing the radius.

$r(n) := \frac{r2 - r1}{99} \cdot (n - 1) + r1$ Check: $r(1) = 0.125\ in$ $r(100) = 3\ in$

$\Delta vel(n) := 2 \cdot \pi \cdot f3 \cdot r(n) \qquad \Delta Vol(n) := T \cdot \pi \cdot \left(r(n+1)^2 - r(n)^2\right) \qquad \Delta M(n) := Density \cdot \Delta Vol(n)$

Note: $\frac{f1}{f3} = 5.2055857253685 \qquad Force1_{total} = 59.3367709755509\ lbf \qquad 128)$

$$Force3_{total} := \sum_{n=1}^{100} \frac{\Delta M(n) \cdot \Delta vel(n)^2}{r(n)} \qquad Force3_{total} = 59.3368689652443\ lbf \qquad 129)$$

It is seen that at $f3 = 9.9253Hz$, $Force1_{total}$ is equal to $Force3_{total}$.

Also: $$V3 := \frac{1}{2} \cdot r2^2 \cdot \omega 3 \cdot B - \frac{1}{2} \cdot r1^2 \cdot \omega 3 \cdot B \qquad V3 = 0.093079930042785 \text{ volt}$$ 130)

Finally, the power into a matched load impedance while holding the inertial force a constant is:

1 disk: $$Sg3 := \frac{V3^2}{2Rg} \qquad Sg3 = 86.6387337676973 \text{ watt} \qquad Sg1 = 28.1836159087778 \text{ kg m}^2 \text{s}^{-3}$$

$$\frac{Sg3}{Sg1} = 3.07408155320175$$ 131)

Faraday Generator Analysis Conclusion:

This proves the feasibility of the Faraday Generator for large power generation. Reducing the rate of rotation to keep the inertial forces constant still achieves a significant increase in output power while increasing the radius of the disk magnets. Then the output power by this method is directly proportional to the increase in radius while the inertial force remains the same.

Therefore, increasing the rate of rotation is not the way to increase the output power since eventually the inertial force will pull apart the magnet. Simply increasing the radius while reducing the rate of rotation will hold the inertial forces within safe limits and is the proper way to increase the output power.

It may be argued that increasing the radius will increase the resistance proportionally but this is not the case since resistance is proportional to the product of resistivity times length divided by area and area increases as the square of the radius. This means that the resistance would actually be proportional to the inverse of the radius increase. Thus, resistance would actually go down which would increase the current output, not decrease it. Utilizing the above concept, a point will be reached where the power output is more than required to make up for bearing and brush friction. The theoretical current output is unlimited into zero ohms. A cryogenic approach may yield fantastic results concerning small size Faraday generators that are able to achieve tremendous power outputs.

It is a fact that the current or power drawn from a Faraday generator does not reflect back to the generator as a load. Thus drawing power from the Faraday generator does not cause it to slow down at all. As a result, it is much more suitable for generating power than the conventional generators that use time dependent magnetic fields which are load sensitive.

Finally, the use of the Faraday generator as a space flight power supply would be ideal since the size of the disk magnet would not be limited by gravitational force stressing the magnets due to their shear weight consideration.

Ω

Post note:

The quantum fluxoid is in volt*sec units: $$2 \cdot \Phi_o \cdot q_o = 6.62607546866278 \times 10^{-34} \text{ joule} \cdot \text{sec}$$

The interaction of the quantum fluxoid with charge is the foundation of Plank's constnat, h. and $$h = 6.6260755 \times 10^{-34} \text{ kg m}^2 \text{s}^{-1}$$

References:

1. http://www.electrogravity.com

2. http://www.electrogravity.com/EnergySpiral_3/EnergySpiral_3.pdf, p. 32, eq. 119.

3. Ibid; Ref. 1.

4. Folger, Tim, Discover Magazine Special Printing, Spring, 2009, p. 72, Article titled, "Time May Not Exist."

5. Dunn, Christopher, "The Giza Powerplant" Bear & Company, Copyright 1998 by Christopher Dunn. See p. 168 for a detailed picture which can be scaled for the actual distance between resonators.

6. Kiefer, Claus, "Does Time Exist In Quantum Gravity?", p. 5 http://fqxi.org/data/essay-contest-files/Kiefer-fqx.pdf